



RIFT TD TUTORIAL

UPSTREAM BOUNDARY DEPOSITION

INTRODUCTION

In this tutorial you will develop an upstream tailings deposition model. Deposition takes place from a perimeter boundary into the facility, with deposition points moving into the deposition basin as they are raised.

A copy of the **Rift TD** Users Manual may be useful when working through this tutorial. It is installed during **Rift TD** installation, but can also be downloaded from our [download page](#).

TUTORIAL COMPONENTS

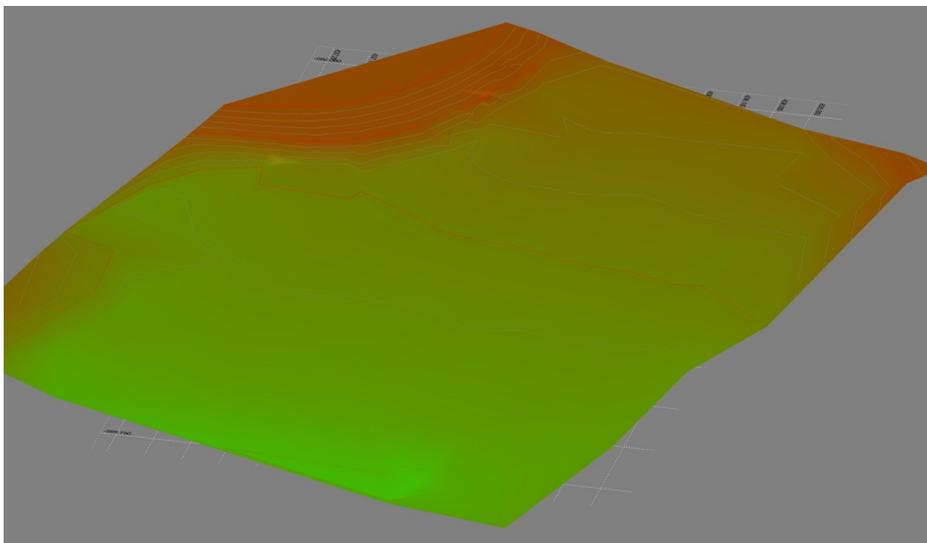
This tutorial comprises:

- This instruction set.
- **Rift TD** files:
 - Base Model.rft: The base model used to develop the deposition surface.
 - Final Model.rft: The final deposition model.
 - Final Model.res: The deposition model result file.
- Text Files (ASCII data files):
 - Survey Data.txt: The ASCII data file used to generate the base topography.
 - Deposition Line.txt: Deposition boundary coordinates.

BASE TOPOGRAPHY

This tutorial provides the **Rift TD data file, Base Model.rft**, as a starting point:

- **Click File > Open.**
- **Select Base Model.rft.**
- **Click Open.**



MODEL DEFINITION

A deposition model comprises:

- Raise Elevations:
- A Vector Slope.
- Beach Profiles.
- Material parameters.
- A Supernatant Pond.
- A Deposition Line.

RAISE ELEVATIONS

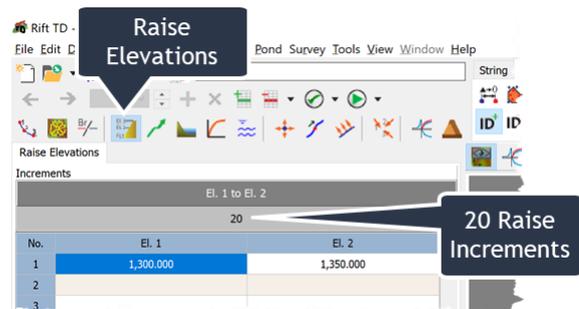
Raise Elevations define the elevations that deposition vectors will be **raised to**, and the **raise increment**.

In this tutorial you will raise deposition vectors from their initial elevation of

- 1300 m; to an elevation of
- 1350 m; in
- 20 raises i.e. 2.5m raise increments.

To **set** the **Raise Elevations**.

- **Activate Raise Elevations:**
 - **Click Edit > Raise Elevations;** or
 - **Click the Raise Elevation Tool-button.**
- **Enter 20 Raise Increments** on the **Raise Increment Grid**.
- On the **Data Grid:**
 - **Enter** an **initial elevation, El. 1**, of **1300 m**.
 - **Enter** a **final elevation, El. 2**, of **1350 m**.



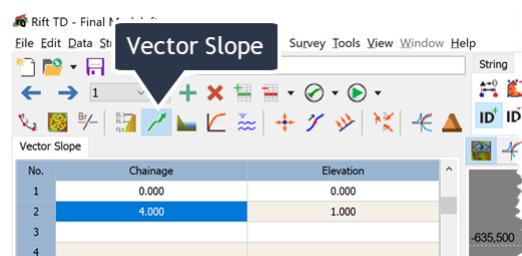
VECTOR SLOPE

A **Vector Slope** defines how deposition vectors move horizontally as they are raised vertically.

In this tutorial you will specify a **Vector Slope** of **1 Vertical in 4 Horizontal**.

To **define** the **Vector Slope**:

- **Activate Vector Slopes:**
 - **Click Edit > Vector Slope;** or
 - **Click the Vector Slope Tool-button.**



- Enter the **Vector Slope** on the **Data Grid**:
 - Row 1:
 - Chainage: 0.00.
 - Elevation: 0.00.
 - Row 2:
 - Chainage: 4.00.
 - Elevation: 1.00.

No.	Chainage	Elevation
1	0.000	0.000
2	4.000	1.000
3		
4		
5		

BEACH PROFILE

Beach Profiles define a **longitudinal section** along a **beach**.

A typical model has two beach profiles:

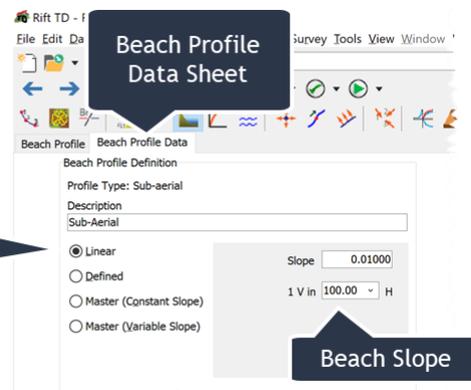
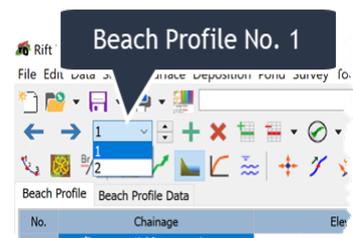
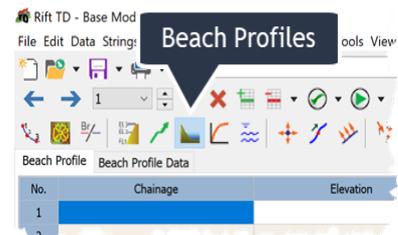
- **Sub-aerial profile**: The beach profile above the supernatant pond.
- **Sub-aqueous profile**: The beach profile below the supernatant pond.

You will define both profiles as linear profiles with a:

- Sub-aerial slope of 1V:100H.
- Sub-aqueous slope of 1V:50H.

To **define** the **Beach Profiles**:

- Either:
 - Click **Edit > Beach Profiles**; or
 - Click the **Beach Profiles Tool-button**.
- If not active, use the **Navigation toolbar** to **activate Beach Profile No. 1**.
- Click on the **Beach Profile Data Sheet**.
 - Enter a **description** of “**Sub-Aerial**”.
 - Set the **profile type** to **linear**.
 - Enter a **beach slope** of **1V in 100H**.
- Use the **Navigation Toolbar** to **activate Beach Profile No. 2**:
 - Enter a **description** of “**Sub-Aqueous**”.
 - Set the **profile type** to **linear**.
 - Enter a **beach slope** of **1V in 50H**.



MATERIAL

Materials define:

- The **Deposition Rate** over time [mass per day].
- The **Complex Beach Profile** comprising a:
 - Sub-aerial profile, a
 - Sub-aqueous profile, and if necessary, a
 - Cyclone profile.
- **Material densities**.

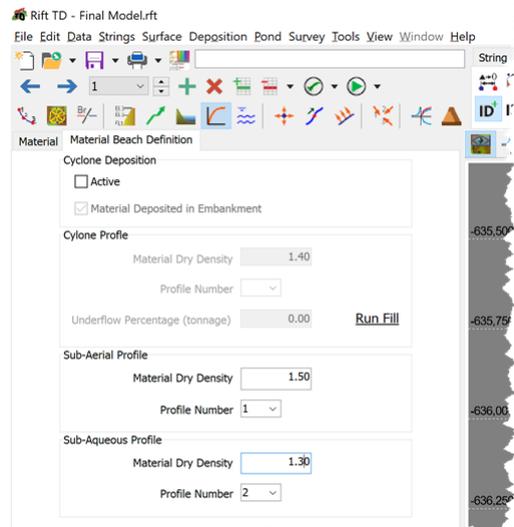
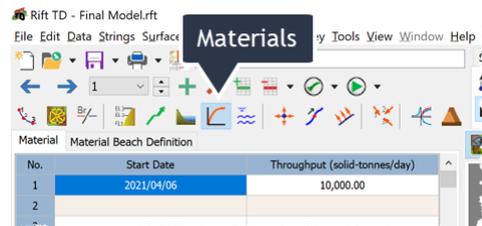
In this tutorial you will **define**:

- A **throughput** of **10,000 tonnes per day**.
- **Use** the two previously defined **Beach Profiles** to **define** the **complex beach profile**.
- **Sub-aerial** and **sub-aqueous densities** of **1.5** and **1.3 tonnes/m³** respectively.

To **define** the **Material**:

- **Activate Materials**:
 - **Click Edit > Materials**; or
 - **Click the Material Tool-button**.
- On the **Data Grid** **enter**:
 - A **start date** of **6 April 2021**.
 - A **throughput** of **10,000 tonnes per day**.
- **Click** the **Material Beach Definition Sheet**.
 - **Ensure** that **Cyclone Deposition** is **NOT Active**.
 - **Set** a **sub-aerial density** of **1.5 tonnes/m³**.
 - **Use** the **Sub-aerial Profile Drop Down Box** to **set** the **Sub-aerial Beach Profile** to **Beach Profile No. 1**.
 - **Enter** a **sub-aqueous density** of **1.3 tons/m³**.
 - **Use** the **Sub-aqueous Profile Drop Down Box** to **set** the **Sub-aqueous Beach Profile** to **Beach Profile No 2**.

Cyclone Profiles are used to model beach cyclone deposition and are not required for this model.

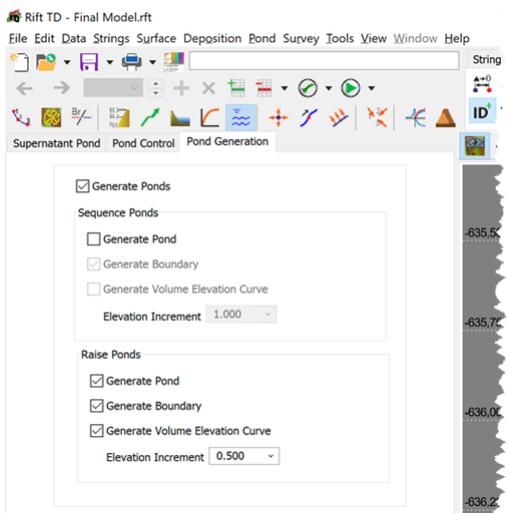
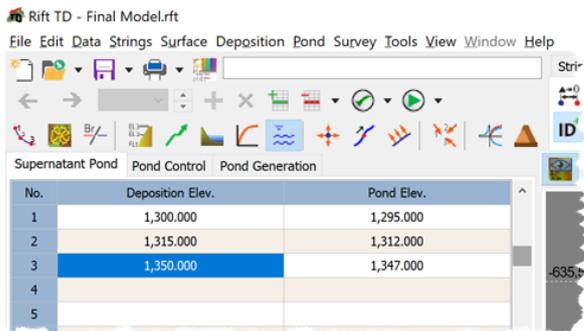
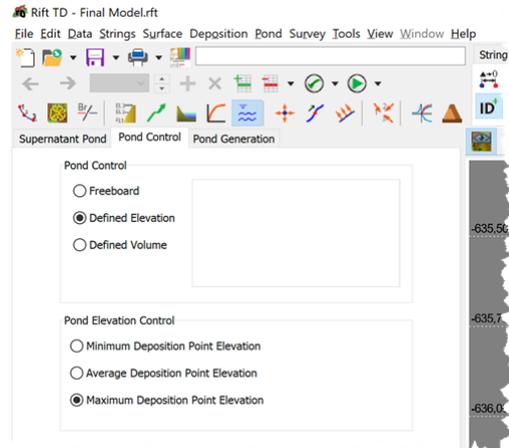
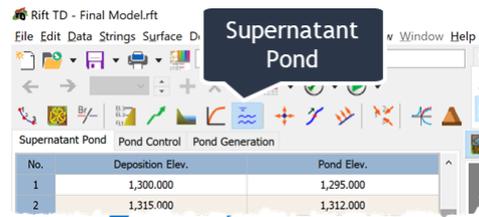


SUPERNATANT POND

The **Supernatant Pond** defines the **interface between the sub-aerial and sub-aqueous beaches**. In this tutorial you set a **defined Pond Elevation** relative to the **Maximum Deposition Point Elevation**.

To **define** the **Supernatant Pond**:

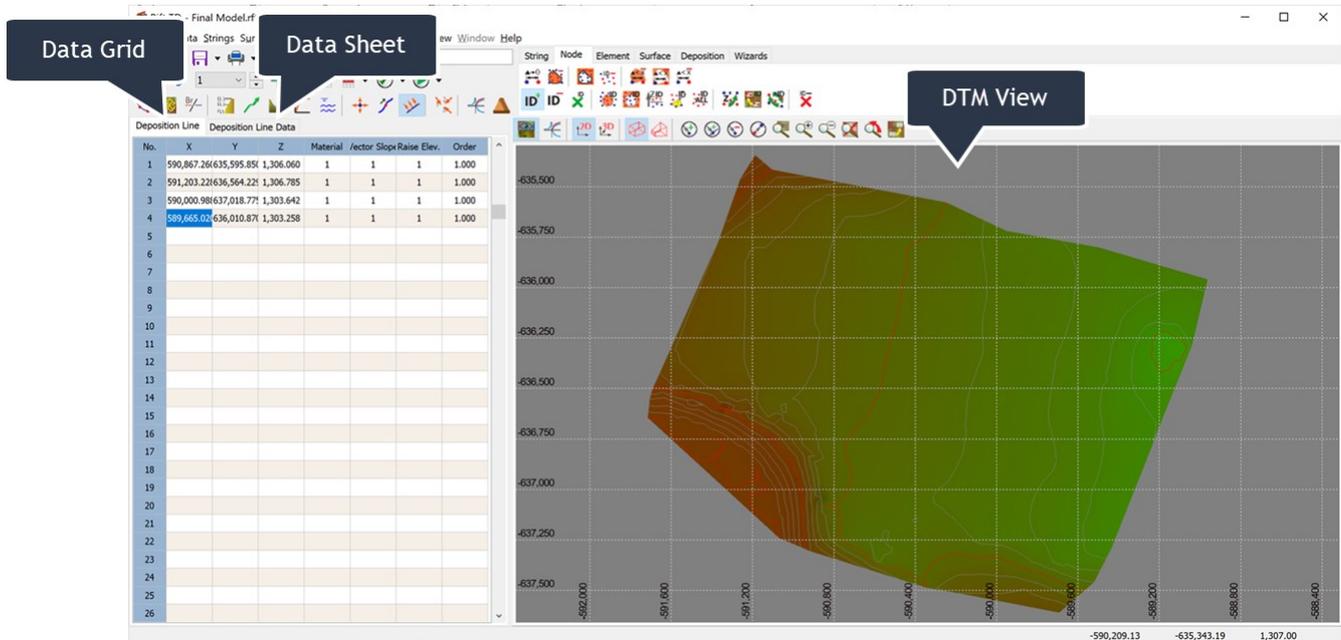
- **Activate** the **Supernatant Pond**:
 - **Click Edit > Supernatant Pond**; or
 - **Click the Supernatant Pond Tool-button**.
- **Select** the **Pond Control Data-sheet**.
 - **Set** the **Pond Control** to **Defined Elevation**.
 - **Set** the **Pond Elevation Control** to **Maximum Deposition Point Elevation**.
- **Select** the **Supernatant Pond Data-sheet**:
 - **Enter Deposition Elevation/Pond Elevations** of:
 - 1,300 1,295
 - 1,315 1,312
 - 1,350 1,347
- **Select** the **Pond Generation Data-sheet**:
 - **Check Generate Ponds**.
 - **Sequence Ponds**:
 - **Uncheck Generate Ponds**.
 - **Raise Ponds**:
 - **Check Generate Raise Ponds**.
 - **Check Generate Raise Pond Boundary**.
 - **Check Generate Volume Elevation Curve**.
 - **Enter** an **elevation increment of 0.5 m**.



DEPOSITION LINE

Deposition Lines generate **Deposition Vectors** from which deposition takes place. **Deposition Lines** have the following parameters:

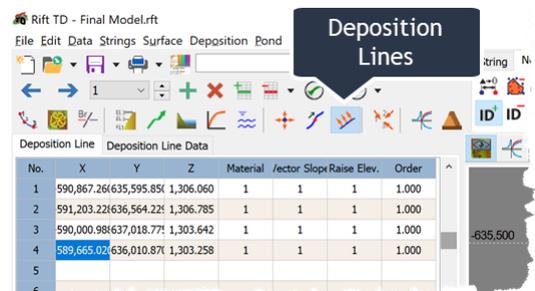
- On the **Data Grid**:
 - Coordinates.
 - Materials.
 - Raise Elevations.
 - Vector Slopes.
- On the **Deposition Line Data Sheet**:
 - Deposition Direction.
 - Vector Direction.



- Vector Spacing.

To **define** the **Deposition Line**:

- **Activate Deposition Line**:
 - Click **Edit > Deposition Lines**, or
 - Click **Deposition Line Tool-button**.
- **Define** the **Deposition Line** visually on the **DTM View**:
 - Click **Data > Edit in View > Add**; or
 - Click the **View Add Tool-button**; or
 - **Right click** on the **DTM View** and **click Data > Add**.



- Click on the **DTM View** to **define** the **Deposition Line Coordinates**.
- **Deactivate DTM View Add Data:**
 - Press **Escape**; or
 - Click **Data > Edit in View > Add**; or
 - Click the **View Add Tool-button**; or
 - **Right click** on the **DTM View** and **click Data > Add**.
- On the **Data Grid:**
 - Enter the **indices** for the previously defined:
 - **Material No. 1.**
 - **Vector Slope No. 1.**
 - **Raise Elevation No. 1.**
 - Enter a **Deposition Order of 1.**
 - Click the **Deposition Line Data-sheet.**
 - On the **Deposition Line Data Sheet set:**
 - The **Deposition Line** to **Active**.
 - The **Boundary** to **Closed**.
 - The **Deposition Direction** to **Inside Boundary**.
 - The **Vector Direction** to **Inside Boundary**.
 - A **Fixed Vector Spacing** of **75 m**.
 - **Generate** the **Deposition Vectors:**
 - Click **Deposition > Deposition Vector > Generate All Vectors**; or
 - Click the **Generate Deposition Vector Tool-button**.

You can import coordinates. This tutorial includes an **ASCII file, Deposition Line.txt**, that has the **Deposition Line** definition.

Click **File > Import > ASCII** to import the data.

No.	X	Y	Z	Material	/vector	Slopi	Raise	Elev.	Order
1	590,867.26	635,595.85	1,306.060	1	1	1	1	1.000	
2	591,203.22	636,564.22	1,306.785	1	1	1	1	1.000	
3	590,000.98	637,018.77	1,303.642	1	1	1	1	1.000	
4	589,665.02	636,010.87	1,303.258	1	1	1	1	1.000	
5									
6									

UPSTREAM DEPOSITION

Active Model Options

Boundary Closed Embankment

Auto Determine

Deposition Direction

Vector Direction

Deposition Direction

Inside Boundary

Outside Boundary

360 Degrees

Vector Direction

Inside Boundary

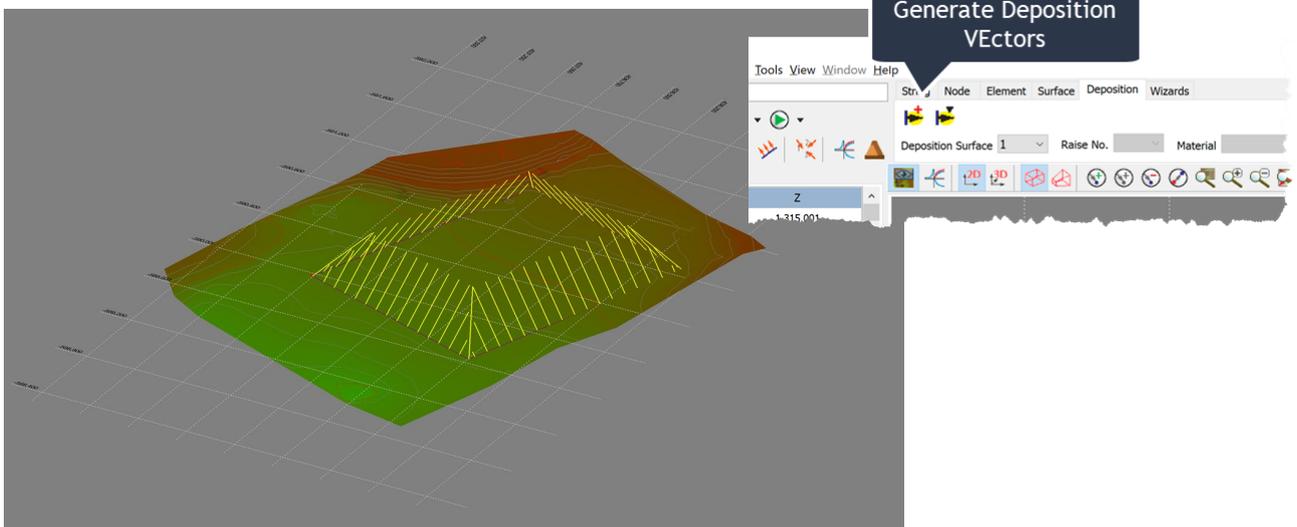
Outside Boundary

On Boundary (Vertical)

Vector Spacing

Fixed Number of Vectors 5

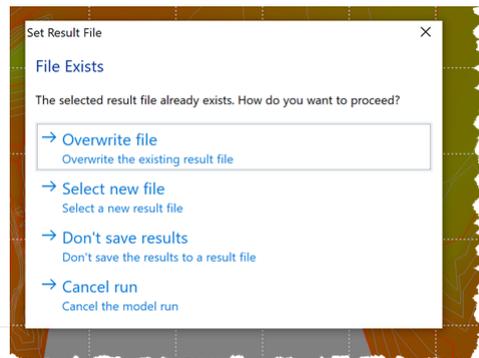
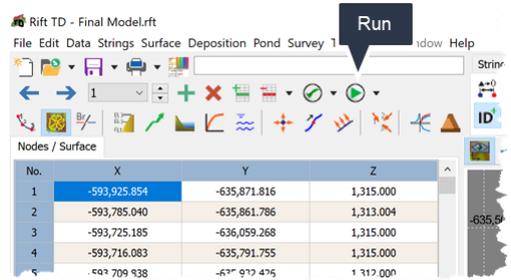
Fixed Vector Spacing 75.0



MODEL RUN

To **run** the **deposition model**:

- Either:
 - Click **Run > Run Model**; or
 - Click the **Run Tool-button**.
- If the result file already exists:
 - You are **prompted** for a **Result File Name**. Click **Ok** to retain the existing file.
 - Select **Overwrite File** on the **Set Result File Task Dialog**.



After the model run **Deposition Results** are **shown** on the **Data Grid** and the **Result View**. A **tutorial** on **Deposition Result Output** is available at riftxone.com.

Deposition Results Tool-button

Result View Tool-button

Result View

Deposition Results

No.	End Date	Inulative Vol	ulative Tonn	Rate of Rise	Aerial Beach	queous Beach
1	2021/04/27	141,303.50	211,955.25	32.454	1,305.000	NAN
2	2021/11/04	1,419,211.68	2,128,683.06	4.764	1,307.500	NAN
3	2022/12/10	4,153,091.34	6,132,154.46	2.281	1,310.000	1,306.333
4	2024/02/14	7,172,051.79	10,446,804.30	2.116	1,312.500	1,309.167
5	2025/04/02	10,095,549.60	14,578,085.07	2.210	1,315.000	1,312.000
6	2026/05/15	12,982,927.14	18,651,901.76	2.241	1,317.500	1,314.500
7	2027/06/12	15,766,327.70	22,583,010.50	2.323	1,320.000	1,317.000
8	2028/06/21	18,422,523.52	26,338,907.23	2.431	1,322.500	1,319.500
9	2029/06/17	20,965,471.86	29,943,320.88	2.533	1,325.000	1,322.000
10	2030/06/04	23,453,143.69	33,380,342.57	2.590	1,327.500	1,324.500
11	2031/05/08	25,830,960.12	36,646,956.88	2.703	1,330.000	1,327.000
12	2032/03/27	28,109,863.39	39,836,405.27	2.816	1,332.500	1,329.500
13	2033/01/30	30,274,870.61	42,953,976.97	2.963	1,335.000	1,332.000
14	2033/11/16	32,313,617.33	45,999,776.52	3.142	1,337.500	1,334.500
15	2034/08/20	34,251,416.49	48,984,599.49	3.303	1,340.000	1,337.000
16	2035/05/17	36,138,924.72	51,922,381.81	3.382	1,342.500	1,339.500
17	2036/02/03	37,972,494.49	54,822,050.38	3.476	1,345.000	1,342.000
18	2036/10/05	39,672,554.83	57,684,610.18	3.741	1,347.500	1,344.500
19	2037/05/24	41,279,776.47	60,518,015.18	3.953	1,350.000	1,347.000
20						
21						
22						
23						
24						
25						
26						

Summary

Date: 06 Aug 2037

Raise Volume: 1,626,883

Raise Tonnage: 2,357,163

Cumulative Volume: 41,503,381

Cumulative Tonnage: 59,666,957